

Technology Opportunity

Extremely Bandwidth Efficient Wireless Digital Modem

The National Aeronautics and Space Administration (NASA) Lewis Research Center has developed a digital approach for broadcasting high-fidelity audio (nearly CD-quality sound) in the commercial frequency-modulated (FM) broadcast band. This digital approach provides a means of achieving high data transmission rates with low hardware complexity, including low mass, size, and power consumption.

Potential Commercial Uses

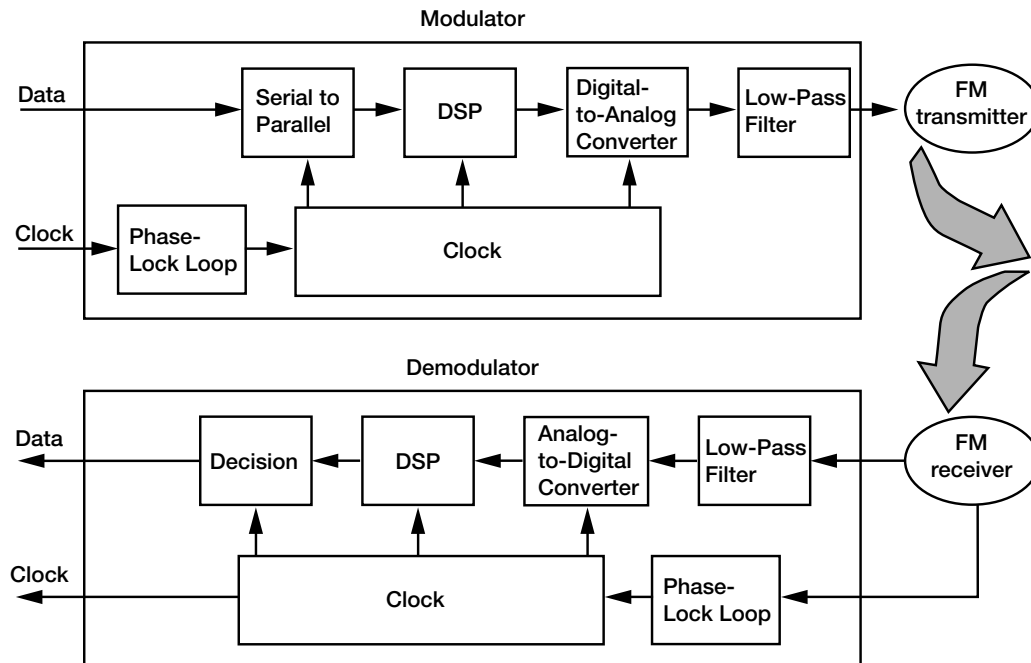
- Digital wireless data communication applications (commercial, industrial, educational, and institutional) at data transmission rates up to 76 kilobits per second (kbps)
- Wireless transmission of point-of-sale data, hospital records, and automated factory control signals

Benefits

- Low cost—this digital implementation is based on inexpensive, commercially available Digital Signal Processing (DSP) hardware
- High throughput—digital modems provide high data transmission rates (up to 76 kbps), almost 3 times faster than current telephone modems (28.8 kbps)
- Small size—DSP uses a board size comparable to that of a computer modem

The Technology

NASA Lewis has completed the design and prototype development of an extremely bandwidth efficient wireless digital modem (modulator and demodulator) that uses high spectrally efficient



Bandwidth-efficient wireless digital modem with 16-ary quadrature amplitude modulation.



modulation techniques and low-complexity commercial DSP hardware and software to perform up and down conversions and pulse-shaping. Thus, the digital modem can transmit data at rates up to 76 kbps, almost 3 times faster than a 28.8-kbps telephone modem. The digital modem also offers improved power and spectral performance, flexible operation, and low-cost implementation.

Options for Commercialization

NASA Lewis has designed an extremely bandwidth efficient digital modem under a nonreimbursable Space Act Agreement with Telos System, which is based in Cleveland, Ohio. Telos Systems has explicit potential markets and applications for the modem in the commercial FM broadcast band, both in transmitting data-reduced digital signals and in broadcasting high-fidelity audio. The DSP techniques demonstrated in the application are suitable for digital wireless data communication applications. If your company is interested in possible collaboration efforts on similar prototype product developments through no-cost or cost-reimbursable Space Act Agreements, please contact NASA Lewis.

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Key Words

Digital modem
Spectrally Efficient Modulation Techniques
Digital Signal Processing
Bandwidth
Pulse-shaping Filters



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